



CBS Inc., Suite 1000  
One Farragut Square South  
1634 I Street, N.W.  
Washington, D.C. 20006  
(202) 457-4513

Mark W. Johnson  
Washington Counsel

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DEC 5 1995

FEDERAL COMMUNICATIONS COMMISSION  
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**Re: En Banc Hearing in MM Docket No. 87-268**

December 5, 1995

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Dear Mr. Caton:

Enclosed are an original and nine copies of the written statement of Joseph A. Flaherty in connection with the December 12 en banc hearing in the above proceeding. I also enclose a copy of Dr. Flaherty's curriculum vitae.

By copy of this letter, I am submitting 10 copies of the enclosure to the Mass Media Bureau. If there are any questions, please call me or contact me by Internet e-mail at [mwjohnson@cbs.com](mailto:mwjohnson@cbs.com).

Yours truly,

Mr. William F. Caton  
Acting Secretary  
Federal Communications Commission  
1919 M Street, N.W., Room 222  
Washington, DC 20554

cc: Mr. Saul Shapiro  
Mass Media Bureau

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Before the  
**Federal Communications Commission**  
Washington, D.C. 20544

In the matter of

Advanced Television Systems  
and Their Impact Upon the  
Existing Television Broadcast Service

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MM Docket No. 87-268

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En Banc Hearing On Digital Television

Testimony of Joseph A. Flaherty FIEE  
Senior Vice President - Technology  
CBS Inc.

December 12, 1995

**Testimony of Joseph A. Flaherty FIEE  
Senior Vice President - Technology  
CBS Inc.**

**December 12, 1995**

Eight years ago, the Commission appointed its Advisory Committee On Advanced Television Service to oversee the development of a new terrestrial broadcasting transmission system that would ensure the technological competitiveness of free, over-the-air broadcasting until far into the next century. Two years and eight months later, on June 1, 1990, General Instrument proposed an all digital terrestrial HDTV system, and television was forever changed.

By the dawn of the 21st century, digital, wide screen TV will offer a technical quality and diversity of application as different from today's analog television as the introduction of color was from the early 28 line mechanical scanning television experiments of Baird and Campbell-Swinton. The only question is whether or not terrestrial broadcasters will be able to participate in this new domain, or whether full quality digital TV and HDTV will be exclusively the domain of cable, fiber, DBS, and home video.

In the terminal years of this century, broadcasting is facing a dramatic challenge, and our Nation's ability to meet and manage this challenge will determine the character of broadcasting's future, and may mark its very survival.

Digital technology is not just on the way, it is here. Home computers, of course, have proliferated. Telecommunications systems from cellular telephones to fax machines are using digital technology. Digital television sets, set-top boxes and VCR's will be available very soon, and direct broadcasting satellites in America were launched as digital services at the outset to take advantage of compression techniques to multiply their channel count and to enable HDTV transmission.

Cable operators in America have completed their digital compression studies, and larger cable systems are already converting to digital transmission to increase their channel count. Fiber based television systems now being developed will also be able to deliver multi-channel high quality digital TV and HDTV programs to a cable-like customer base.

With increased cable, fiber, and DBS competition, traditional broadcasters will be under enormous pressure to secure a place in the landscape of 21st century television and a place in its information infrastructure where there are no analog channels.

As our 50 year old analog technology gives way to its digital replacement, television will make the most fundamental technological change since its invention and its subsequent colorization. I call this "digitization" a revolution because digital technology will radically change television's means of communication, its quality, its flexibility, the breadth of the business, the effectiveness of the service,

and virtually every aspect of the medium. Every broadcaster in America will feel the impact of this revolution as they transition to digital TV, making massive financial investments to duplicate, and finally to eliminate, their analog plants.

But this transition is absolutely necessary. Only digital technology will provide competitive parity for broadcasters, and only the same digital technology will provide broadcasters the essential interoperability with the digital systems of the NII. Analog NTSC cannot provide NII interoperability! Analog television will not be able to participate in the media convergence that is at the heart of the vision of many for the future of communications, and it will certainly become a second-class service out of the technological mainstream.

In short, terrestrial broadcasters simply must make the transition to digital television, and the only way they can make this transition, with full quality TV and HDTV transmission potential, is to have a second 6 MHz television channel on which to operate the digital TV and HDTV service in parallel with the NTSC service during the analog-to-digital transition period. At the end of this period, the broadcaster will have the same spectrum bandwidth as that assigned today, but the country will have a vastly improved television service.

Of critical importance is the fact that the VHF and/or UHF TV channels to be assigned for digital transmission are already allocated for broadcast television. They are the last channels available to make the digital transition, because this is the only spectrum suitable for terrestrial over-the-air transmission of television programs to localized mass audiences.

Thus, for the United States, it is a now-or-never opportunity to move the terrestrial TV service to digital transmission, and, in the move, it is absolutely essential to provide full 6 MHz channels to enable the full range of transmission options, including HDTV.

Why is HDTV an indispensable component of the digital free television service of the future? Technologists like me might point to the fact that it is a wholly new digital platform which will support the larger and vastly improved displays, such as the "Plasmatron" and other flat screen displays, already beyond the laboratory prototype stage and in final development for commercialization. HDTV, with its Dolby digital surround sound of CD quality, viewed on such large displays will bring the "cinema experience" into the home. Today's 525 line television, even in its digital form, simply cannot support such large high quality displays.

Maybe more important for policymakers is the fact that abandonment of HDTV as the centerpiece of the next generation of television service could permanently disadvantage those who, for whatever reason, will rely on free over-the-air television for the foreseeable future. For example, if broadcasters were locked out of providing the highest quality signals because of a decision to narrow the bandwidth of ATV channels, they could never be competitive with their subscription based competitors.

Wired services and DBS can offer digital TV and HDTV programs at anytime with no technical or regulatory constraints. Even those who argue that HDTV will never "catch on" should keep this in

mind. "Acceptable quality" is a moving target, and decisions today that do not allow for improvements tomorrow could be disastrous for free broadcasting. The NTSC system was successfully designed for a half-century of useful life. In order for a replacement digital system to match that record, it will have to be implemented with sufficient bandwidth to allow it to offer the highest technical quality that will ensure its competitiveness.

Imagine a time in the not-to-distant future that the Major League baseball playoffs might be carried on cable in wide screen HDTV, but the following World Series must be carried by free television in SDTV because of ATV implementation decisions made today. Could anyone believe that this result would be in the public interest?

Since the outset of the Advanced Television program in 1987, the CBS goals for a terrestrial ATV transmission system have been, and still are:

1. Deliver a fully competitive TV and HDTV service;
2. Provide technical headroom to ensure future competitive parity with the alternative media;
3. Preserve the value of existing TV receivers; and
4. Ensure the availability of spectrum required for terrestrial TV and HDTV transmission.

The Grand Alliance system employs MPEG-2 compatible video compression and transport systems with the Dolby AC-3 digital surround sound, and supports wide screen, 16:9, HDTV as its highest quality level along with lower orders of the hierarchy, including standard TV.

In its Final Technical Report the ACATS Technical Subgroup concluded, in part:

"The Grand Alliance digital television standard, based on the Advisory Committee design specifications fulfills the requirements for the U.S. ATV broadcasting standard. Accordingly, the Technical Subgroup recommends that the standard be adopted as the U.S. broadcasting standard."

CBS agrees that the Grand Alliance System fulfills the technical requirements for a digital TV and HDTV transmission system.

This ACATS recommendation, taken without objection of any of its members, represents a monumental success in achieving an important consensus of the entire television industry as fully represented on this Advisory Committee. The private sector, with an expenditure of 500 million dollars, bridged the analog domain, devised the world's first all-digital TV and HDTV system designed to operate in a 6 MHz band, developed it, built it, tested it, and proved it to be the most advanced television system ever conceived.

It now time to standardize and implement this system! Delays will lengthen the transition period, delay the production of digital professional and consumer TV equipment, and could cause the U.S. to lose its leadership in the digital TV field.

Digital broadcasting and HDTV are on the near horizon. It's time to meet the ATV challenge and transition broadcasting to digital TV and HDTV. It wouldn't be the first time that authorizing and enabling a future technology has marked the survival of broadcasting and an improved service for the American public.

Today, the flowering of digital technology opens a wealth of opportunity. Beware of a poverty of vision!

**JOSEPH A. FLAHERTY, D.Sc. FIEE**  
**SENIOR VICE PRESIDENT- TECHNOLOGY**  
**CBS INC.**

Dr. Flaherty received his degree in Physics from Rockhurst College, Kansas City, Missouri, in 1952. After service in the U.S. Signal Corps, he joined CBS in 1957 as a Television Design Engineer, and became Vice President and General Manager of CBS Engineering and Development in 1967, a position he held until his promotion to his present position as CBS Senior Vice President, Technology in 1990.

Dr. Flaherty has been responsible for many innovations in television, including Electronic News Gathering, Electronic cinematography, off-line video tape editing, and the introduction of one-inch videotape, Plumbicon cameras, and the miniature color camera.

Dr. Flaherty is a fellow of the British Institution of Electrical Engineers (IEE), and a Chartered Engineer of the United Kingdom. He is a fellow of the Royal Television Society, a Fellow and Honorary Member of The Society of Motion Picture and Television Engineers (SMPTE), and a fellow of the Chinese Institute of Electronics. He is an honorary member of the Institute of Television Engineers of Japan, and of the German technical society Fernseh-Kinotechnischen Gesellschaft (FKTG). He is a member of the Cosmos Club in Washington, D.C.

Dr. Flaherty is a member of the Executive Committee of the Advanced Television Systems Committee (ATSC), a member of the Board of Directors of the Advanced Television Test Center (ATTC), one of twelve members of the Computer Science and Telecommunications Board's Technology Committee for the Deployment of the National Information Infrastructure, and a Vice President of the International Academy of Broadcasting in Montreux, Switzerland. He was Chairman of the Planning Subcommittee and Co-Chairman of the Technical Subgroup of the FCC Advisory Committee on Advanced Television Service (ACATS) which recommended the HDTV/ATV digital transmission standard to the FCC for adoption as the United States Advanced TV standard.

Dr. Flaherty has been the recipient of many awards including the French Ordre de la Legion d'Honneur - that country's highest award, the French Ordre des Arts et des Lettres, The SMPTE David Sarnoff Gold Medal, The Montreux Achievement Gold Medal, The SMPTE Progress Gold medal, The NAB Engineering Achievement Award, five EMMY Awards including a personal Emmy award for "Lifetime Achievement in Contributions to the Development and Improvement of the Science and Technology of Television", the Montreux International Cinema Festival "Pioneers" award, the 1994 MSTV Engineering Award from the Association for Maximum Service Television, and was named the Alumnus of the Year for Outstanding Achievement by Rockhurst College in Kansas City, Missouri. He is also one of the sixty charter members of the Broadcasting and Cable Magazine "Hall of Fame".

Dr. Flaherty has published many articles in the television field and is a frequent lecturer on television technology, including the presentation of the 1993 "Schoenberg Lecture" of the British Royal Television Society in London.